

EXHIBIT 187
REDACTED

From: Aparna Pappu [REDACTED]
To: Vahab Mirrokni <[REDACTED]>
Sent: Tue, 21 Apr 2015 23:24:31 -0400
Subject: Re: Planning for 2sided rev-share launch
Cc: [REDACTED] Scott Spencer [REDACTED]
Korula [REDACTED] Nitish [REDACTED]

They want transparency because it breaks bernanke. This is the part I am less clear on why is transparency key to bernanke working? By breaks bernanke they mean it means a LOT less money to pubs. I need to see supporting data for that. Nirmal has that.

On Apr 21, 2015 8:14 PM, "Vahab Mirrokni" <[REDACTED]> wrote:

Thanks Aparna. So you say that from [REDACTED]'s point of view, the specific transparency constraint is the major issue, right? [if this is the case, then we should be in good shape. My impression is that others in the gTrade team may want to enforce this constraint though.] See responses inline:

On Tue, Apr 21, 2015 at 10:41 PM, Aparna Pappu [REDACTED]

We care most about access to inventory ideally exclusive access. To do that our strategy has been maximize yield. We don't think about buyer ROI that's up to the buyer.

The good thing about DRS V1 and V2 is that it achieves access to more inventory (but not exclusive) and at the same time, we don't expect it to harm ROI either.

I talked to [REDACTED] today:

The big issue here appears to be GDN thinks this will make pubs less money because their bidding models break.

a) is this true? What data do we have to support that?

you mean, pubs make less money since GDN bidding models based on Bernanke breaks? We don't think this is the case:

- 1) Under both DRS V1 and V2, seller-friendly buyers like GDN will improve their utility per each auction, i.e., they get more impressions each at less price, so they continue using the same bidding strategy, and we think they can continue implementing a similar strategy (although the specific way that they simulate may need to change).
- 2) If 1 is correct, our data from simulations and live experiments show that pubs will get higher pay-out, higher fill-rate, and similar RPM, so it should be very much in pubs' benefit - so pubs will benefit,
- 3) as for the specific way that they can continue their Bernanke-type bidding simulations, we have a couple of concrete proposals that if implemented, it should get them what they want. Nitish is writing a short document summarizing those proposals, and we can share with them in case it helps after initial discussions.

None of these solutions are going to be perfect. A good formal model for revenue sharing is reported in our WWW paper with [REDACTED], but that perfect solution is impractical since it needs to estimate the opportunity cost of publishers and its elasticity. I am all for trying to come up with a strategy to implement those ideas. This was our intention when we discussed all those and filed the patent...

Feedback on comments:

[REDACTED - PRIVILEGE]

* As for being paradoxical, this is a somewhat subjective issue. This argument makes sense if bidders/buyers know their value for impressions, but they don't.

* As for opportunity cost to publishers, I don't think it's a major concern for the first version (given the importance of dealing with [REDACTED], but we can take it into account for later versions. We have notes about this in the 2sided DRS document.

[REDACTED], I probably wasn't clear, sorry: I think that a *good* property of the two-sided DRS proposal is that it can be very slightly modified to obviate this concern about opportunity costs: When we're out of the dynamic region and trying to collect debt, we don't need to decrease the pub_revenue below *what it would have been in the absence of DRS*.

In general regarding opportunity costs, we do have perfect information about at least those opportunity costs that come from remnant ad CPMs. Unrelated to this, Aparna has been suggesting we pass in XfpBackfillToken the different sources of an auction reserve price, which would allow the auction to identify this source of real opportunity costs. But in any case, DRS proposals where pub_revenue >= reserve price for every query can eliminate the opportunity cost concern. (It's important this is per-query, not just on average.)

Nitish

[REDACTED]
It would be great if we can all help [REDACTED] to add other simulations for comparison.
going back to my leave..

[REDACTED]
On Wed, Dec 10, 2014 at 3:37 PM, Nitish Korula [REDACTED]

+1 to the idea of in-depth discussion in a small group, but it would be good if we can do this sooner rather than later, so we don't delay the launch. We should try to minimize the length of time between DRS launch and DRSv2 launch, *whatever* the definition of v2 is.

Here's another concern (that at least I haven't seen addressed) with some of the DRS proposals where the **publisher** pays: This can result in **less** revenue for the publisher, because we don't take into account their opportunity cost from serving unfilled impressions elsewhere. (The WWW paper with [REDACTED]

[REDACTED] talks about this a bit.) In particular, if the reserve price is coming from a remnant ad, then increasing fill rate by matching (some impressions) below their remnant CPM is a clear revenue loss for the publisher. Perhaps this is not significant, but it is important to note that **simulations that only use AdX logs can't validate this**. Therefore, one has to be careful about claiming debt back from the publisher.

Nitish

On Wed, Dec 10, 2014 at 2:24 PM, [REDACTED] [REDACTED]

One suggestion: Should we form a small team around dynamic-DRS? The goal would be to go over all the proposals in little more depth, and try to validate all the assumptions and claims. Some of the claims in design docs are very hand-wavy, so forming a team consisting of different folks would bring transparency. Dynamic-DRS proposals are suggesting a huge deviation from our current auction, so a little caution and transparency would be very helpful for everyone.

Some people I have in mind are [REDACTED]

nitish@[REDACTED]

[REDACTED]
[REDACTED] sals, and then we can present to @Aparna and @Scott to take their blessing.

On a side note, some of my concerns regarding 2-sided DRS which haven't been addressed are:

- 1) Two sided DRS at bidder level can be **unethical**. If coke and pepsi are both bidding through the same bidder, it might happen that we give discounts to coke and make up for those discounts by charging pepsi more.

I would think this is evil? I will advocate for trying two-sided DRS at advertiser level.

2) Two-sided DRS is **paradoxical**. Two-sided DRS is nothing but an accounting scheme.

(Assuming we expect bidders to clear their credit account), an **equivalent strategy** is asking bidders to OPT-IN to the following "Hey AdX, If needed to clear the auction, you can charge me 20% more". But the point is, any bidder can already do that by bidding 20% higher! So when we have already given the control to the bidder to bid high if they want to, why would they want DRX to add 20% extra?

On Wed, Dec 10, 2014 at 7:11 AM, [REDACTED]

@Scott: we'll be using the opt-out process for dynamic RPO, will let you know who qualifies.

On Wed, Dec 10, 2014 at 9:50 AM, Scott Spencer [REDACTED]

This is a great discussion.

One small note is that we should offer the "opt out" we are granting GDN to any other buyer that also provide a real second price (as defined by Google).

I bring this up as I believe there is at least one other buyer that would meet such criteria and, for completeness (not that I think it will actually affect the numbers), we should also model out such buyers.

-scott

On Dec 10, 2014 2:28 AM, [REDACTED]

Thanks [REDACTED] for voicing your opinion clearly. Fortunately, we discuss all these proposals and their pros/cons in the document. I think we should think about 2sided rev-share launch as an opportunity as opposed to a disruptive launch as we can incorporate those changes into the debt collected in 2sided DRS. Basically, it's an improvement over Naive DRS that opens further opportunities for us from sell-side (which is quite important for the whole market).

Let me first make one point clear before discussing things further: we should discuss sell-side auction changes among